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BCP - C

Golder Associates Inc.

2221 Niagara Falls Boulevard, L.P.O. Box 4069
Niagara Falls, NY USA 14304-4069
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Fax (716) 731-1652

REPORT ON

ANCILLARY MEASURES FOR CORRECTIVE MEASURES IMPLEMENTATION BELL AEROSPACE TEXTRON WHEATFIELD, NEW YORK

Submitted to:

Textron Inc.
40 Westminster Street
Providence, RI 02903-2596

DISTRIBUTION:

8 Copies - Robert C. Brayley, Textron, Inc. , Providence, Rhode Island
1 Copy - Golder Associates Inc.; Niagara Falls, New York

January 1997

953-9112

Golder Associates Inc.

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January 15, 1997

953-9112

Textron Inc.
40 Westminster Street
Providence, RI 02903-2596

Attention: Mr. Robert C. Brayley

RE: REPORT ON ANCILLARY MEASURES FOR
CORRECTIVE MEASURES IMPLEMENTATION
BELL AEROSPACE TEXTRON
WHEATFIELD, NEW YORK

Gentlemen:

Golder Associates Inc. (Golder Associates) is pleased to submit the above referenced report on Ancillary Measures for the Corrective Measures Implementation (CMI) being conducted at the former Bell Aerospace Textron facility located in Wheatfield, New York. The Ancillary Measures consist of two components meant to enhance the on-site system of the CMI: direct routing by pipe to the Walmore Road storm sewer of the Atlantic Research Corporation's rocket testing facility discharge; and, construction of two slurry barriers within the backfill of the 36-inch diameter sanitary sewer along Walmore Road. This report presents the as-built documentation of construction of the two components of the Ancillary Measures.

Golder Associates provided construction observation for the project. Based on the results of the field observations, and on the construction information provided by others, Golder Associates is of the professional opinion that the Ancillary Measures were installed in substantial compliance with the original designs.

Very truly yours,

GOLDER ASSOCIATES INC.

David J. Mitchell, P.G.
Engineering Geologist/Project Manager

Anthony L. Grasso, P.G.
Associate/Senior Hydrogeologist

Attachments

F/N: ANCMEAS.DOC

TABLE OF CONTENTS

1. INTRODUCTION

1.1 General

Textron Inc., formerly Bell Aerospace Textron (BAT) has conducted a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of the Neutralization Pond Solid Waste Management Unit (SWMU) at their Wheatfield Plant in the town of Wheatfield, New York (Figure 1). The investigation was conducted in order to determine the nature and extent of organic compounds released from the Neutralization Pond to the groundwater beneath the site.

The RFI report was submitted to the New York State Department of Environmental Conservation (NYSDEC) in June 1991 (Golder Associates Inc. (Golder Associates), June 1991). The RFI concluded that overburden soils and groundwater adjacent to the Neutralization Pond had been impacted by chlorinated organic compounds and that a Dense Non-Aqueous Phase Liquids (DNAPL) plume and an associated dissolved phase plume were present within groundwater of the upper bedrock.

A preliminary review and assessment of potential remediation methods for the impacted groundwater was submitted to NYSDEC and the U.S. Environmental Protection Agency (USEPA) in September of 1990 (Golder Associates, September 1990). Subsequently, in June 1991, a Corrective Measures Study (CMS) was submitted which evaluated in detail the available techniques which could be used to remediate the site (Golder Associates, June 1991). The NYSDEC and USEPA accepted the CMS on June 7, 1991. The CMS contained a conceptual remedial program which the NYSDEC and USEPA determined appropriate for remediation of the contaminated plumes emanating from the site. The corrective measures presented within the CMS consisted of extraction wells, configured into both off-site and on-site systems, to withdraw water from area soils and bedrock and deliver the water to treatment facilities.

On May 22, 1992, NYSDEC was delegated corrective action authority under the Hazardous and Solid Waste Amendments (HSWA). BAT was issued a final 6 NYCRR Part 373 Permit (Permit), effective September 14, 1992. The Permit required BAT to submit Corrective Measures Implementation Plans (CMIs) for the on-site and off-site remedial systems. Furthermore, the NYSDEC and USEPA determined that implementation of the off-site corrective measures would take precedence over the on-site measures. The final CMI for the off-site system was submitted to the agencies in March 1992 (Golder Associates, 1992) and was subsequently accepted in April of 1992. Construction for the off-site system was initiated in October 1992 and concluded with the system being brought on-line in March 1993. The final CMI for the on-site system was submitted to the agencies in March 1993 (Golder Associates, 1993) and was subsequently accepted. Following its' construction, the on-site system has been on-line and operating since April of 1995.

1.2 Ancillary Measures

Along with review and recommendations on primary corrective actions (i.e. extraction wells), the CMS recommended several ancillary measures be undertaken to assist in the remediation of the site. Specifically, the recommended ancillary measures focused on reducing recharge of the shallow bedrock aquifer (Zone 1 aquifer) beneath the site. In the CMS, two primary sources of recharge to the Zone 1 aquifer were identified:

- Discharge of non-contact cooling water from the Atlantic Research Corporation (ARC) Rocket Test Cell Facility to a surface drainage ditch located north of the facility and extending to, and along, Walmore Road (Figure 2); and

- Seepage flow within and through the granular backfill of a 36 - inch sanitary sewer main located along the west side of Walmore Road and adjacent to the BAT facility.

Recharge from these features to the Zone 1 aquifer is thought to influence the migration of the dissolved phase plume located beneath the site. Consequently, several ancillary measures were proposed to control this recharge, one of which, replacing a length of drainage ditch along Walmore Rd., was completed in June of 1991. Golder Associates, on behalf of BAT, presented as-built documentation of this ancillary measure to the NYSDEC in August, 1991 (Golder Associates, August 1991).

BAT decided to delay any potential future alteration to the ARC site drainage channel and Walmore Road sanitary sewer until the on-site component of the groundwater extraction system was operational and the effect of dewatering Zone 1 was evaluated. As stated previously, the on-site system has been essentially fully operational since April 1995. Golder Associates has been monitoring the performance of the on-site extraction system through the on-site Effectiveness Monitoring program. Since the start-up of the on-site system, Golder Associates has noted higher than anticipated extraction well pumping rates indicating significant recharge to the shallow bedrock aquifer in the vicinity of the on-site system. Consequently, BAT decided to implement the remaining ancillary measures in an effort to increase the extraction well drawdown and overall effectiveness of the on-site system.

1.2.1 ARC Storm Sewer

Golder Associates was retained by BAT to design a drainage system which would convey discharge of ARC non-contact cooling water to a storm sewer located parallel to Walmore Road. The ARC discharge is characterized by frequent (i.e. approximately once/day) high volume events of warm (80° to 90° F) water. Prior to implementation of this ancillary measure, the ARC discharge flowed through an open, unlined channel located north of the former Neutralization Pond (see Figure 3). The newly installed drainage system is meant to reduce, if not eliminate, recharge of the Zone 1 bedrock due to seepage from ARC discharge events. The drainage system design included an approximately 1,000 foot storm sewer extension (corrugated exterior, smooth interior high density polyethylene pipe)

connecting the discharge point at the ARC Rocket Testing Facility to the existing storm sewer located parallel to Walmore Road (Figure 2). The eastern end of the storm sewer was designed to connect to the existing storm sewer at a catch basin at Walmore Road. The design included the installation of a catch basin approximately mid-way along the alignment to facilitate drainage of surface water from upgradient catchment areas.

In addition to providing the storm sewer design, Golder Associates performed construction observation and completed a final as-built drawing of the newly installed system. The construction observation summary, final as-built drawings, and photographic log are presented herein.

1.2.2 Walmore Road Sanitary Sewer Slurry Barriers

Golder Associates was retained by BAT to design two hydraulic barriers within the backfill of a 36 - inch sanitary sewer located along the west side of Walmore Road (Figure 4). The method of construction of the sanitary sewer along Walmore Road is somewhat atypical in that the backfill of the sewer from below the pipe to nearly ground surface entirely consists of crushed rock (median stone size of 1 to 2 inch). Additionally, it is known that the sewer was placed partially in rock along Walmore Road and that blasting methods were utilized to create the excavation for the sewer where rock was excavated. As a consequence of this construction method, and considering an unlined drainage channel is located directly adjacent to the sewer for a lengthy expanse north of the BAT facility, it is thought that the sewer backfill acts as a significant receptor of surface water runoff during precipitation events. As previously discussed, the barriers are meant to "dampen" the potential recharge to the Zone 1 aquifer from flow and exfiltration out of the sewer backfill. The design of the hydraulic barriers (slurry barriers) consisted of pre-treated lumber forms set to a depth below the backfill of the sewer and oriented perpendicular to the sewer alignment with a slurry of flowable fill (i.e. coal fly ash and portland cement) poured between the forms to complete the barriers.

In addition to providing the slurry barrier design, Golder Associates performed construction observation and completed final as-built drawings of the two barriers. The construction observation summary, final as-built drawings, and photographic log are presented herein.

2. CONSTRUCTION SUMMARY

2.1 General

This section presents a summary of the field observations performed by Golder Associates during construction of the ARC storm sewer and slurry barriers along Walmore Road. Field observations consisted of photographic documentation and field notes of construction progress. Additionally, considering the construction activities were performed as part of the BAT facility remediation and in areas potentially impacted by groundwater contamination, Golder Associates conducted air monitoring for particulates (dust) and volatile organics during the construction process. Specific details of structures and as-built conditions for the storm sewer are provided on Figure 5 and Figure 6, while specific details of as-built conditions for the slurry barriers are provided on Figure 7.

BAT retained the Haseley Companies, Inc. (Haseley) to install the storm sewer, while Marcor Environmental Remediation, Inc. (Marcor) was retained to install the slurry barriers. Construction of the storm sewer began in July 1996 and concluded in August 1996. Construction of the slurry barriers was initiated on October 30, 1996, and concluded on November 12, 1996.

2.2 Construction Observation Summary - ARC Storm Sewer

Haseley mobilized equipment to the site on July 19, 1996. Preparation for construction of the sewer included clearing the alignment of brush and debris, removal of several fences in the path of the alignment, and stripping and stockpiling of salvaged topsoil and vegetative matter. Following these activities, Haseley transported pre-qualified clay fill to the site from the Summit Clay Pit in the Town of Wheatfield and constructed a temporary access road along the alignment to facilitate installation of the sewer. So as not to disrupt the operating schedule of ARC, a high capacity pump was placed at the ARC Rocket Test Facility discharge point and operated to convey discharge from the facility around the active construction areas.

Materials of construction for the sewer consisted of the following:

- Bedding - New York State Department of Transportation (NYSDOT), Item 605.0901, #1 crushed stone; and
- Pipe - Hancor Hi-Q, 24 - inch inside diameter/ 28.4 -inch outside diameter, corrugated exterior, smooth interior (Manning's n=.010), high density polyethylene pipe with Sure-Lok silt tight (gasketed) couplings.

Excavation of the pipe trench and installation of stone bedding and pipe was initiated at approximately station 0 + 30. The typical sequence of pipe installation consisted of the following:

- Excavation of several hundred feet of trench followed by field surveying (by Haseley) of the trench base;
- Deposition of approximately 1 to 2 inches of bedding stone within the trench;
- Placement of several 20 foot pipe sections within the trench;
- Coupling of the pipe sections;
- Field surveying of the inverts of the coupled pipe sections (by Haseley); and
- Deposition of bedding along the sides of the pipe and excavation to a height approximately equal to the pipe spring line followed by manual shovel spading of the bedding to achieve uniform seating of the pipe within the bedding.

At station 3+05, a pre-cast concrete catch basin (catch basin B) was set in place to allow for a direction change in the sewer alignment. The design of catch basin B incorporates an inlet to capture surface water runoff from areas north-west of the sewer alignment. Following placement of catch basin B, inlet and outlet pipe connections were made at the basin, with pipe penetrations sealed using a low shrink mortar. Following placement of this catch basin, Haseley continued with installation of the remainder of the sewer pipe. At station 9 +20, the reinforced concrete pipe segment and flaired entrance section which previously drained the ARC drainage swale was removed. Subsequently, the new storm sewer was connected to the existing catch basin along Walmore Road and the pipe was

grouted in place using a low shrink mortar. Haseley then proceeded to place and compact cover fill (pre-qualified clay fill) over the storm sewer to a minimum compacted thickness of 0.5 feet above the top of pipe. As cover fill placement proceeded, at station 0+00, forms were set in place and a cast-in-place concrete catch basin (catch basin A) was constructed to complete the connection of the ARC Rocket Test Facility discharge to the new storm sewer.

Upon completion of fill placement over the storm sewer and rough grading along the alignment, disturbed areas were then fine graded and surface water drainage channels were formed and graded to drain to catch basin B. Silt fencing was then entrenched at intervals along the primary (east-west) drainage channel and disturbed areas were straw mulched, seeded, and fertilized. A tackifier was sprayed over the mulch to hold it in place.

Specific details of structures and as-built conditions for the storm sewer are provided on Figure 5 and Figure 6. Documentation of Golder Associates' air monitoring for particulates and organic vapors is provided in Appendix A. As indicated by the air monitoring documentation, levels above action levels for either particulates or organic vapors were not recorded during installation of the storm sewer. Appendix B provides photographic documentation of the storm sewer installation.

2.3 Construction Observation Summary - Slurry Barriers

Marcor mobilized equipment to the site on October 30, 1996. Materials of construction for the slurry barriers consisted of the following:

- Formwork - pre-treated lumber 2" x 10" sheeting and wales; 4" x 4" struts; and
- Slurry mix
    1. Slurry barrier "A": Niagara Mohawk E-Z Fill CF 150 (per cubic yard: 150 lbs cement, 2273 lbs fly ash, 448 lbs water) admixed with 100 lbs/cubic yard powdered bentonite; and

2. Slurry barrier "B": base of excavation to 5 feet below ground surface (BGS), Niagara Mohawk E-Z Fill CF 100 (per cubic yard: 100 lbs cement, 2273 lbs fly ash, 417 lbs water); 5 feet BGS to ground surface, Niagara Mohawk E-Z Fill CF 150 (per cubic yard: 150 lbs cement, 2273 lbs fly ash, 448 lbs water) admixed with 100 lbs/cubic yard powdered bentonite.

Construction of the slurry barriers was initiated on October 30, 1996 with the installation of slurry barrier "B" (see Figure 4 for location). Slurry barrier "B" was completed on November 6, 1996. Installation of slurry barrier "A" (see Figure 4 for location) was initiated on November 4, 1996 and completed on November 7, 1996. Final grading and clean-up at the two locations was complete by November 12, 1996. The following presents the general construction sequence which was employed during installation of both slurry barriers:

- Removal of a thin veneer of topsoil in area of excavation;
- Excavation of stone backfill to a depth of approximately 7 feet BGS using a tracked backhoe;
- Placement of pre-constructed forms in excavation;
- Using a high suction vacuum truck, removal of stone backfill while advancing forms to a depth equivalent to six (6) inches above the crown of the pipe;
- Through a combination of hand excavation and vacuuming, removal of the stone backfill around the sides of the sanitary sewer pipe and beneath the pipe base;
- Placement of forms along the sides of the pipe to a depth equivalent to the sewer trench base (clay base at slurry barrier "B", fractured rock base at slurry barrier "A");
- Slurry mix poured to a height approximately three (3) feet above the top of pipe, allowed slurry mix to harden at least twenty-four hours;
- Slurry mix poured to a height of six (6) inches below ground surface, allowed slurry mix to harden at least twenty-four hours; and

- Excavation spoils placed and graded across the top of the barrier to an elevation equivalent to ground surface (topsoil and Walmore Road patching materials re-placed at slurry barrier "A").

Specific details of as-built conditions for the slurry barriers are provided on Figure 7. Documentation of Golder Associates' air monitoring for organic vapors is provided in Appendix C. Given that the excavations and installations for both slurry barrier "A" and slurry barrier "B" were conducted in moist to wet stone backfill, monitoring for particulates was not performed. As indicated by the air monitoring documentation, levels above action levels for organic vapors were not recorded during installation of the slurry barriers. Appendix D provides photographic documentation of the slurry barrier installations.

3. EFFECTIVENESS MONITORING

The effectiveness of implementation of the ancillary measures on increasing the extraction well drawdown and overall effectiveness of the on-site system will be evaluated during the performance monitoring event scheduled for January 1997. Preliminary evaluation of the effectiveness of the storm sewer installation has indicated the absence of mounding of ground water which was previously observed at extraction well DW-9 following ARC Rocket Test Facility discharge events. Extraction well DW-9 is located in relatively close proximity to the newly installed storm sewer. The absence of ground water mounding in this area following ARC discharge events would appear to indicate a reduction in recharge to the shallow aquifer from this source. Additionally, measurements from temporary piezometers completed within the stone backfill of the Walmore Road sanitary sewer, located upgradient and downgradient of each slurry barrier, have indicated a head loss across (north to south) each barrier.

4. SUMMARY

Based on the results of field observations, Golder Associates is of the professional opinion that the ancillary measures described herein were installed in substantial compliance with the original design plans. The effectiveness of implementation of the ancillary measures on increasing the extraction well drawdown and overall effectiveness of the on-site system will be evaluated during the performance monitoring event scheduled for January 1997.

On behalf of Textron, Inc., Golder Associates appreciates NYSDEC's cooperation in resolving the environmental issues at the facility. Should you have any questions regarding the contents of this report, please call.

GOLDER ASSOCIATES INC.

David J. Mitchell, P.G.
Engineering Geologist/Project Manager

Anthony L. Grasso, P.G.
Senior Hydrogeologist/Associate

DJM/ALG:djm

F/N: ANCMEAS.DOC

REFERENCES

1. Golder Associates Inc., "Neutralization Pond Project, Draft Technical Review and Preliminary Analysis of Remedial Alternatives, Bell Aerospace Textron, Wheatfield, New York," September 1990.

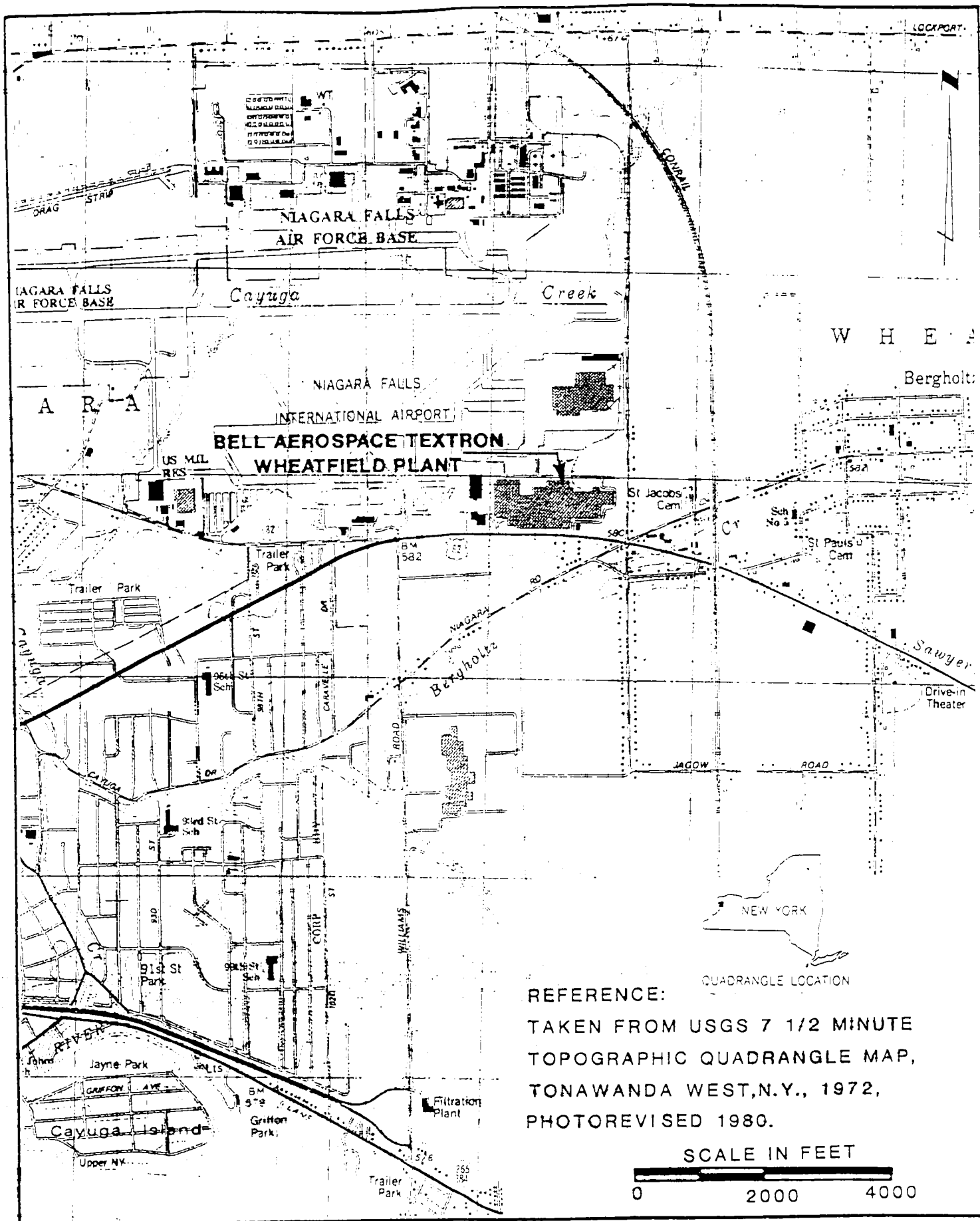
2. Golder Associates Inc., "Final Report RCRA Facility Investigation Pond" Bell Aerospace Textron, Wheatfield Plant, June 1991.

3. Golder Associates Inc., "Final Report, Corrective Measures Study, Bell Aerospace Textron, Wheatfield Plant, Niagara Falls, New York," June 1991.

4. Golder Associates Inc., "Report on the Walmore Road Storm Drainage Improvement Project at Bell Aerospace Textron," June 1991.

5. Golder Associates Inc., "Final Report on Corrective Measures Implementation Plan, Off-site System, Bell Aerospace Textron, Wheatfield Plant," March 1992.

6. Golder Associates Inc., "Final Report, Corrective Measures Implementation Plan Onsite System, Bell Aerospace Textron, Wheatfield Plant," March 1993.



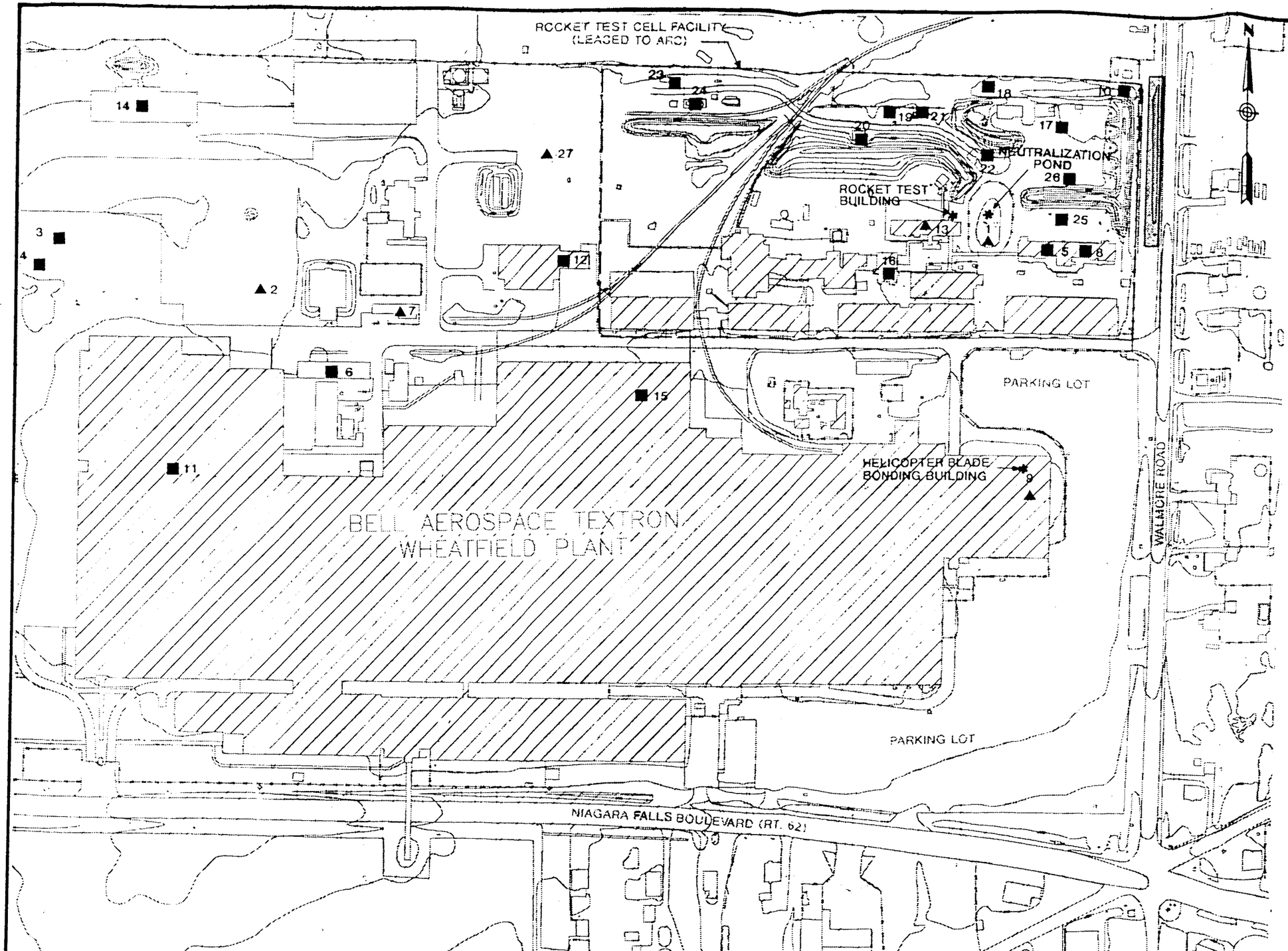
REFERENCE:
TAKEN FROM USGS 7 1/2 MINUTE TOPOGRAPHIC QUADRANGLE MAP, TONAWANDA WEST,N.Y., 1972, PHOTOREVISED 1980.

SCALE IN FEET
0 2000 4000

JOB No.: 953-9112	SCALE: AS SHOWN	SITE LOCATION MAP	
DRAWN: BEC	DATE: 6/4/93		
CHECKED: ALG	DWG. No.: 8		
Golder Associates		BELL AEROSPACE TEXTRON	FIGURE 1

158696

BUF/FILE # 9141014



LEGEND

Unit No.	Description	Status
1.	Neutralization Pond	RR
2.	Former Drum Storage Yard	RR
3.	Drum Accumulation	NFAR
4.	Drum Accumulation	NFAR
5.	Drum Accumulation	NFAR
6.	Drum Accumulation	NFAR
7.	Lab Pack Accumulation	RR
8.	Rock Engine Test Cells W,X,Y,Z	NFAR
9.	Helicopter Blade Bonding Building	RR
10.	Underground Transfer Lines	NFAR
11.	Underground Tanks for Aviation Gas	NFAR
12.	Incinerator	NFAR
13.	Rocket Tank Test Building	RR
14.	Chemistry Laboratory	NFAR
15.	Foundry	NFAR
16.	H Test Cells	NFAR
17.	Drum Storage Shed	NFAR
18.	Fuel Area Shed	NFAR
19.	Peroxide Catalyst Bed	NFAR
20.	Peroxide Drum Storage Area	NFAR
21.	Caustic Storage	NFAR
22.	Liquid Caustic Storage Tank	NFAR
23.	Acid Drum Storage Area	NFAR
24.	Acid Storage Tanks	NFAR
25.	Slag	NFAR
26.	Drum Storage	NFAR
27.	Drum Accumulation Boiler Houses	RR

NOTE: RR - Remediation Required
NFAR - No Further Action Required

* SOLID WASTE MANAGEMENT UNITS INVESTIGATED BY NEUTRALIZATION POND STUDIES

▲ SOLID WASTE MANAGEMENT UNITS REQUIRING REMEDIATION

■ SOLID WASTE MANAGEMENT UNITS REQUIRING NO FURTHER ACTION

□ DRAINAGE IMPROVEMENTS AREA (JUNE, 1991)

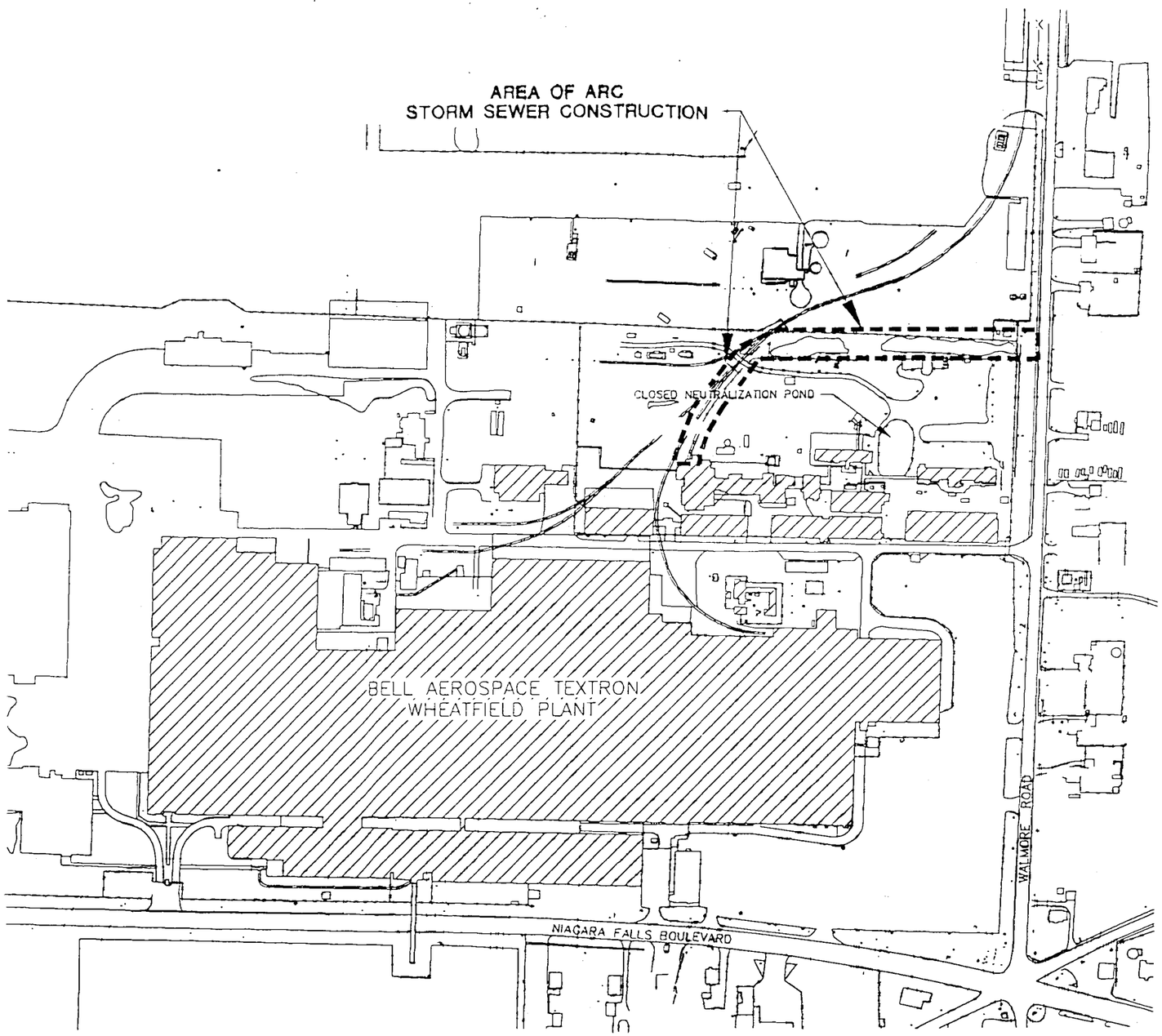
JOB NO.	953-9112	SCALE	1"=200'
DRAWN	LAS	DATE	02/08/91
CHECKED	RJFK	DWG. NO.	NY01-152

Golder Associates

FACILITY LAYOUT

BELL AEROSPACE TEXTRON | FIGURE 2

152110



N

NOTE

SEE FIGURES 5 AND 6 FOR ACTUAL LOCATION OF STORM SEWER CONSTRUCTION.

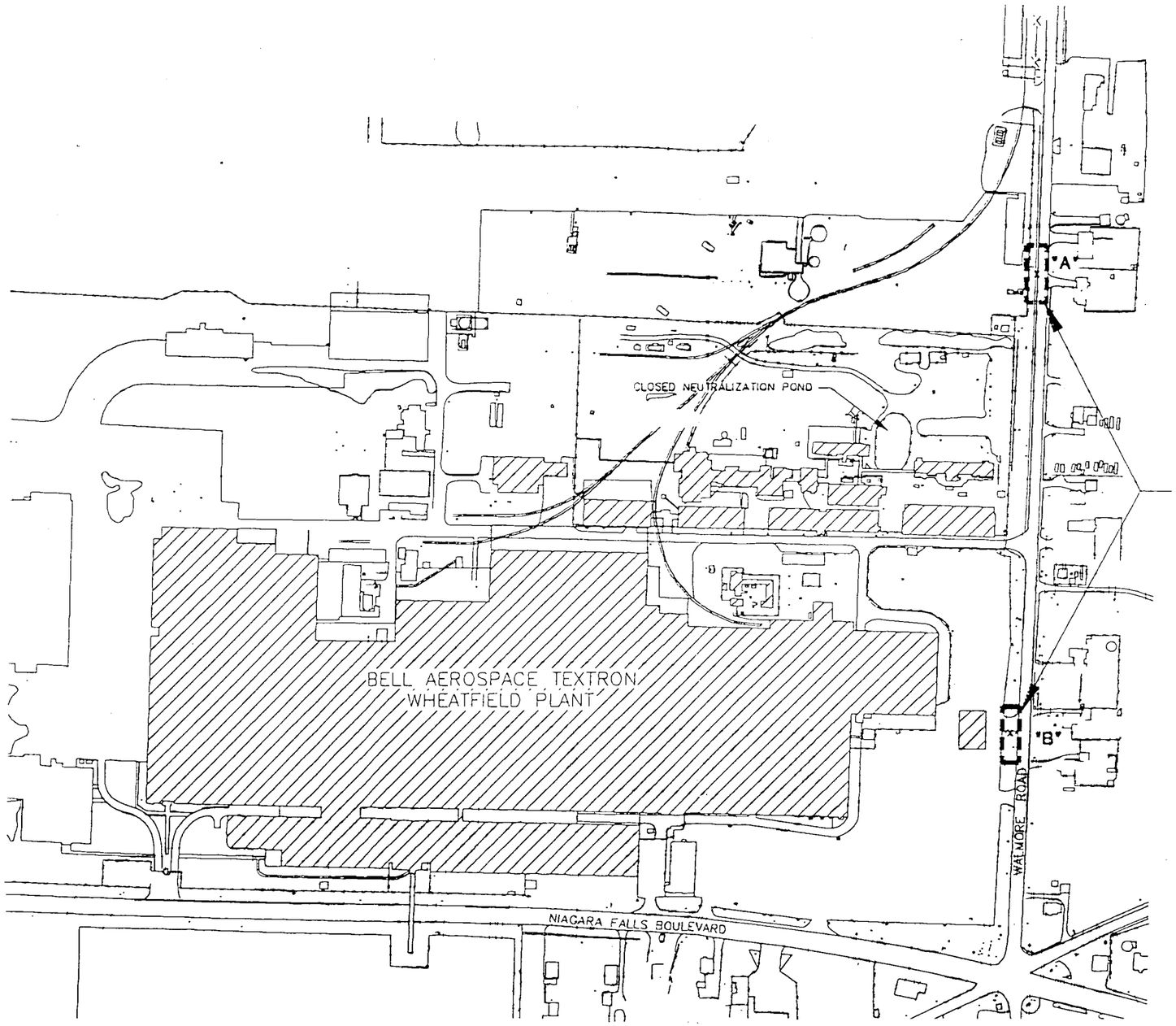
300 0 300
scale feet

Golder Associates Buffalo, New York

CLIENT/PROJECT
BAT/REMEDIAL DESIGN/NY

TITLE
ARC STORM SEWER LOCATION

DRAWN	BEC	DATE	10/9/96	JOB NO.	953-9112
CHECKED	DJM	SCALE	AS SHOWN	DWG. NO.	BELL89
REVIEWED		FILE NO.	953-9112	FIGURE NO.	3



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NOTE

SEE FIGURE 7 FOR AS-BUILT DETAILS OF SLURRY BARRIERS.

300 0 300
scale feet

Golder Associates Buffalo, New York

CLIENT/PROJECT
BAT/REMEDIAL DESIGN/NY

TITLE
SLURRY BARRIER LOCATIONS

DRAWN	BEC	DATE	12/13/95	JOB NO.	953-9112
CHECKED	DJM	SCALE	AS SHOWN	DWG. NO.	BELL69
REVIEWED	AM	FILE NO.	953-9112	FIGURE NO.	4

APPENDIX A

Air Monitoring Results
ARC Storm Sewer Installation

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/18/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather Cloudy Temp. 75°F Wind D. NE V 0-2 mph

Instrument Type PID / Particulate Meter Serial No. 000184 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
9:30	0+00 TO 9+50	PID	0	
		Part.	0.00 mg/m³	
15:20	0+00 TO 9+50	PID	0	
		Part	0.02 mg/m³	

Recommendations

PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Iso-butylene. Particulate Meter factory calibrated. Particulate background range 0-35 ug/m³, avg. 2 (ug/m³ (duration of project).

David Waha
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/19/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather CLOUDY Temp. 75°F Wind D. SE V 10-20 mph

Instrument Type PID / Particulate Meter Serial No. 000184 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
13:45	0+00 To 9+50	PID	0.0 ppm	
		Part.	0.00 mg/m³	

Recommendations

PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Iso-butylene. Particulate Meter factory calibrated. Particulate background range 0-35 ug/m³, avg. 21 ug/m³ (duration of project).

David Welty
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/22/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather SUN Temp. 80°F Wind D. NE V 0-10

Instrument Type PID / Particulate Meter Serial No. 000184 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
13:45	0+00 to 9+50	PID	0.0 ppm	
		Part.	50 ug/m³	
14:00 -	1+30	PID	0.0	Continuous
16:10		Part	20 ug/m³ ave.	Monitoring

Recommendations

PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Iso-butylene. Particulate Meter factory calibrated Particulate background range 0-35 ug/m³, avg. 21 ug/m³ (duration of project).

David Wehn
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/23/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather CLOUDY Temp. 75°F Wind D. E V 5-20

Instrument Type PID / Particulate Meter Serial No. 000184 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A

and Concentration • If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
15:00	3+00	PID	0.0 ppm	
		Part.	30 ug/m³	

Recommendations

PID Calibration Check - Inst. reads 1025 ppm with ~100 ppm Iso-butylene. Particulate Meter factory calibrated

Particulate background range 0-35 ug/m³, avg. 21 ug/m³ (duration of project).

David Wehn
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/24/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather CLOUDY Temp. 70°F Wind D. NE V 0-10

Instrument Type PID / Particulate Meter Serial No. 000184 / 5863

Calibration Gas 100 ppm Isc / N/A and Concentration Instrument Reading See below Span/Gain/RF Setting N/A

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
9:00	0+00 TO 9+00	PID	0.0 ppm	
		Part.	0 ug/m³	
13:45	2+75	PID	0.0 ppm	Continuous
		Part.	10 ug/m³	ave

Recommendations

Initial PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Isobutylene. Particulate Meter factory calibrated. Particulate background range 0 - 35 ug/m³, avg. 21 ug/m³ (duration of project).

David Wehn
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/25/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather P. CLOUDY Temp. 70°F Wind D. NE V 5-15

Instrument Type PID / Particulate Meter Serial No. 000184 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A

and Concentration • If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
9:30	3+00	PID	0.0 ppm	Work - aligning pipe to
		Part.	30 ug/m³	catch Basin B
13:00 - 15:30	3+00 to 4+10	PID	0.0 ppm	Continuous monitoring
		Part.	~50 ug/m³	

Recommendations

Initial PID Calibration Check - Inst. reads 102.5 ppm with ~100 ppm Iso-butylene. Particulate Meter factory calibrated

Particulate background range 0-35 ug/m³, avg. 21 ug/m³ (duration of project).

David Wehn
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/26/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather Sun Temp. 75°F Wind D. E V 5-15

Instrument Type PID / Particulate Meter Serial No. 000884 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A

and Concentration • *If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.*

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
13:30 - 15:00	6+10 - 6+90	PID	0.0	Continuous monitoring while excavating
		Part.	20 ug/m³	

Recommendations

PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Iso - butylene. Particulate Meter factory calibrated

Particulate background range 0 - 35 ug/m³, avg. 21 ug/m³ (duration of project)

David Wehn
Printed Name

Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 7/30/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather Overcast Temp. 70°F Wind D. W V 10-15

Instrument Type PID / Particulate Meter Serial No. 000184/5863

Calibration Gas 100 ppm Isc / N/A Instrument Reading See below Span/Gain/RF Setting N/A and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
1100-1120	9+00	PID	0.0 ppm	Trench alignment adjacent to BAT berm on South side
1100-1120	9+00	Part.	8 to 16 ug/m³.	
1500-1535	9+20	PID	0.0 ppm	
	9+20	Part.	0 to 21 ug/m³	

Recommendations

Initial PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Isc-butylene. Particulate Meter factory calibrated

Particulate background range 0-35 ug/m³, avg. 21 ug/m³ (duration of project).

David J. Mitchell
Printed Name

David J. Mitchell
Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 8/9/96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD

Time In — Time Out — Weather Clear Temp. 74°F Wind D. W V 10-15

Instrument Type PID / Particulate Meter Serial No. 000154 / 5863

Calibration Gas 100 ppm Isc / N/A Instrument Reading See below Span/Gain/RF Setting N/A and Concentration

** If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.*

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
		PID		
1030 - 1100	at Walmore Rd.	Part.	0 to 17 ug/m³	At Walmore Rd. @ storm sewer connection point. Finishing some top soil placement along the alignment

Recommendations

Initial PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Isc-butylene. Particulate Meter factory calibrated

Particulate background range 0 - 35 ug/m³, avg. 21 ug/m³ (duration of project).

David J. Mitchell
Printed Name

David J. Mitchell
Signature

APPENDIX B

Photographic Log
ARC Storm Sewer Installation

PHOTOGRAPH LEGENDS - STORM SEWER INSTALLATION

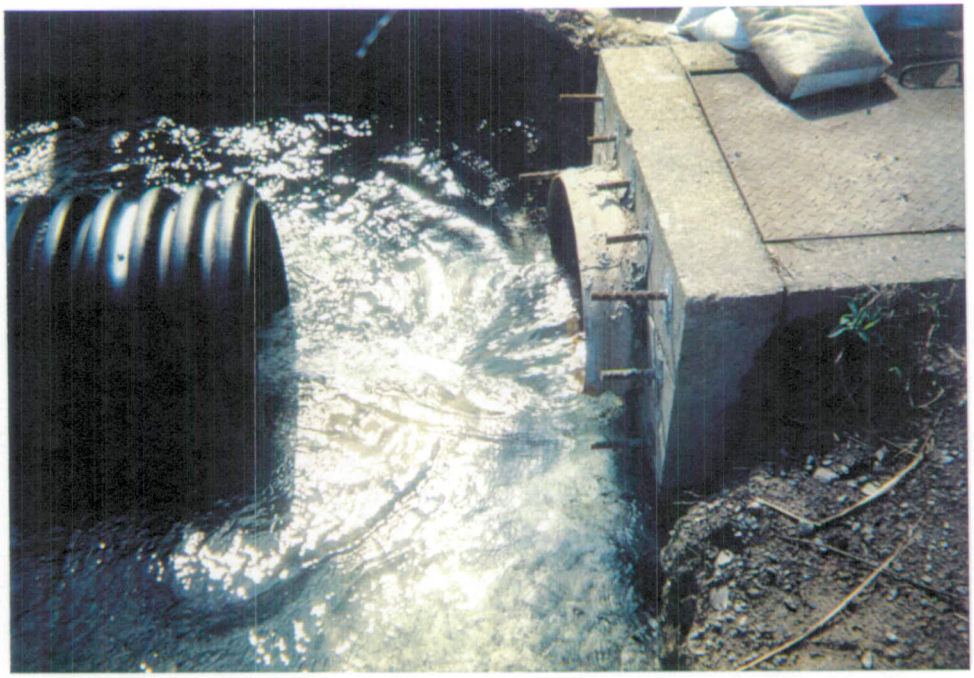
Photograph #	Description of Photograph
1.	Looking north - station 0+25, sewer construction.
2.	Looking east - station 3+50, sewer construction.
3.	Sewer connection to drop inlet at Walmore Road.
4.	Pump for temporary re-routing of ARC discharge - station 0+00.
5.	ARC discharge event prior to completion of storm sewer.
6.	Looking south - station 3+00 final grading and seeding.
7.	Looking northeast - station 2+90 final grading and seeding.
8.	Looking east - station 3+10 final grading and seeding.
9.	Looking north - station 0+00 completed sewer.
10.	Looking east - station 2+90 completed sewer.

1.

2.

3.

4.



5.

6.

7.

8.

9.

10.

APPENDIX C

Air Monitoring Results
Slurry Barrier Installations

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 10-31-96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD — Slurry Barrier "B"

Time In — Time Out — Weather Overcast Temp. 35°F Wind D. — V —

Instrument Type PID / ~~Particulate Meter~~ Serial No. 000154 / 5863

Calibration Gas 100 ppm Isc / N/A and Concentration Instrument Reading See below Span/Gain/RF Setting N/A

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
1000	~10' BGS	PID	0.0	Reading taken when groundwater first encountered. Reading taken above surface of groundwater within trench.
		~~Part.~~		

Recommendations

Initial PID Calibration Check - Inst. reads 102.5 ppm with 100 ppm Isc-butylene. ~~Particulate Meter factory calibrated~~

David J. Mitchell
Printed Name

David J. Mitchell
Signature

Golder Associates Inc.

AIR MONITORING DATA SHEET

Date 11-6-96 Sheet 1 of 1

Job Name BAT / REMEDIAL DESIGN / NY Job Number 953-9112

Location WHEAT FIELD - Slurry Barrier "A"

Time In - Time Out - Weather Clear Temp. 30°F Wind D. - V -

Instrument Type PID / Particulate Meter Serial No. 000154 / 5863

Calibration Gas 100 ppm Iso / N/A Instrument Reading See below Span/Gain/RF Setting N/A and Concentration

* If more than one instrument is used, document calibration procedures and results for each additional instrument in recommendations section below and indicate the instrument used (eg. OVA, 361, OVM, etc.) for each observation.

Time	Station	Instr.*	Reading	Procedure/Observations/Comments
0900	~11' BGS	PID	0.0	Reading taken when groundwater first encountered. Reading taken above surface of groundwater within trench.
		~~Part.~~		

Recommendations

Initial PID Calibration Check - Inst. reads 102.5 ppm with ~100 ppm Iso-butylene. ~~Particulate Meter factory calibrated~~

David J. Mitchell
Printed Name

David J. Mitchell
Signature

APPENDIX D

Photographic Log
Slurry Barrier Installations

PHOTOGRAPH LEGENDS - SLURRY BARRIER INSTALLATIONS (TYPICAL)

Photograph #	Description of Photograph
1.	Construction of slurry barrier forms.
2.	Initial placement of slurry barrier form.
3.	Vacuuming stone backfill from within forms.
4.	Advancing forms by backhoe pressure.
5.	Forms in-place above exposed sewer pipe.
6.	Forms in-place above exposed sewer pipe.
7.	Pouring slurry mix within forms.
8.	Slurry mix in-place within forms (initial pour).

1.

2.

3.

4.

5.

6.

7.

8.